Building Inventory Options

Craig Cole, S.E.

Degenkolb Engineers

Member EERI N. Cal Chapter EERI

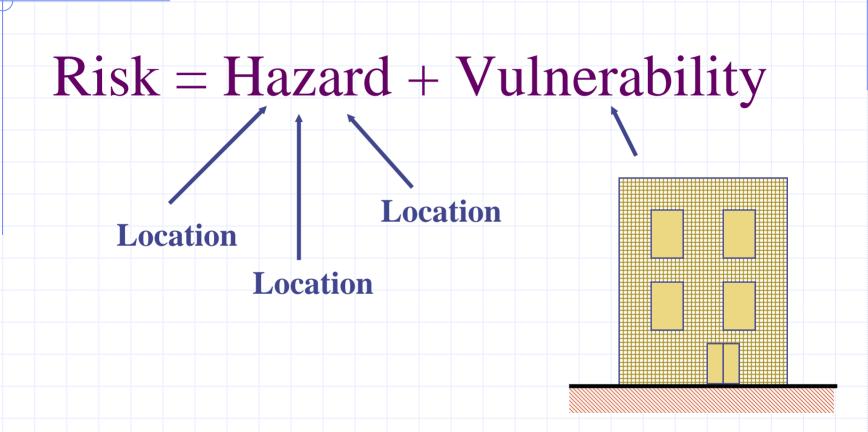
ccole@degenkolb.com



Inventory of Buildings

- Purpose
 - Categorize buildings into high, medium and low seismic risk
 - Prioritize risk of buildings
 - Use to estimate damage potential







Seismic Hazard

Building Address

Shaking Intensity

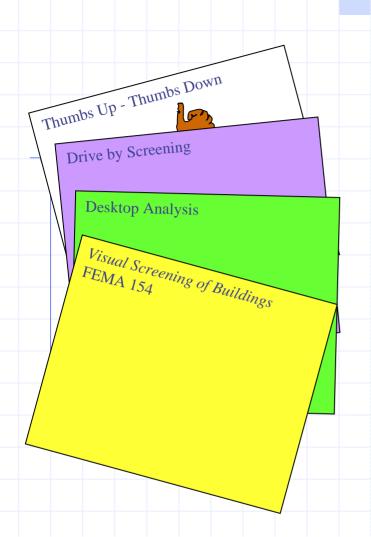
Soil Stability



Seismic Vulnerability

- Key Parameters
 - Age
 - Construction Type
 - No. of Stories
 - Configuration
 - Construction Details





Buildings A. Ch. S. Lasting 3.10. Saismic Exaluation of Existing Seismic Evaluation of Existing Buildings 2 (FEMA 310) Tier 2 Seismic Evaluation of Existing Buildings (FEMA 310) - Tier 3 Seismic Rehabilitation of Buildings FEMA 356 Linear Static Seismic Rehabilitation of Buildings FEMA 356 Linear Dynamic

Seismic Rehabilitation of Buildings FEMA 356 Nonlinear Static

Seismic Rehabilitation of Buildings FEMA 356 Nonlinear Dynamic

Seismic Evaluation of a Portfolio of Buildings

- A suite of types of evaluations is available $\frac{d^3}{d \, x^3} \, f \approx 23. \left[\sum_{i=1}^{100} x_i \cdot y^2 ... \cdot \lim_{0 \to \infty} x^{-1} \sqrt{y} ... \frac{d}{dy} x \right]$

da
$$\frac{d^3}{d x^3} \text{ fx 23.} \left[\sum_{i=1}^{100} x \cdot y^2 \cdot 1 \cdot \lim_{0 \to \infty} x^{-1} \sqrt{y} \cdot \frac{d}{dy} \right]$$



Example - Survey Form - limited information

Building Questionna	re (one sheet per b	ouilding)
Site Name:		
Site Address:		
Building No.: Building Name:		
		Number of Building Comments
Ownership (che City of Burbank	ck one):	Number of Building Occupants:
Leased		Less than 5
If leased, expirati	on: Mo. Year	
li ieaseu, expirati	JII. IVIUı caı	50 to 200
V Puilt (Cha		
Year Built (Check one): before 1950		Greater than 200
1951 to 1970		Construction (best estimate):
1971 to 1990		Foundation:
		Wood Piles
1991 to present		
		Concrete Piles
Area:		Stone
Occupied by Col		re meters Concrete Spread Footings
Occupied by Oth	ers:squa	ire meters Unknown
N5 Ptavian al	- 0	Exterior Walls:
No. of Stories above Grade:		Wood framing
		Concrete frame with brick infill
No. of Basemen	t Levels:	Concrete
	<u> </u>	Concrete Block
Building Occup	ancy Type:	Other
Commercial		Unknown
Manufacturing		Floors:
Assembly		Wood
Warehouse		Concrete
Residential		Concrete on metal deck
Office		Unknown
		Roof:
Contents:		Wood
Liquid Storage in		Concrete
Uninterruptible power supply		Concrete on metal deck
Emergency gene	rator	Unknown
Camaturation Desum	maati au	
Construction Docume Building Plans - Are or		ils available?
Architectural:	Structural:	ins available:
On Site	One Site	
With Architect	With Arch	hitect
With Owner	With Own	
Don't Know	Don't Kno	
I LIDONT KNOW	I I Dont Kno	ow idate:



Example - Survey Form - limited information

Building Questionnaire (one sheet per building))
Site Name:	
Site Address:	
Building No.:	
Building Name:	
Ownership (check one):	Number of Building Occupants:
City of Burbank	Less than 5
Leased	6 to 20
If leased, expiration: MoYear:	21 - 50
	50 to 200
Year Built (Check one):	Greater than 200
before 1950	
1951 to 1970	
1971 to 1990	
1991 to present	



Example - Survey Form - limited information

onstruction (best estimate):	
Foundation:	Floors:
Wood Piles	Wood
Concrete Piles	Concrete
Stone	Concrete on metal deck
Concrete Spread Footings	Unknown
Unknown	Roof:
Exterior Walls:	Wood
Wood framing	Concrete
Concrete frame with brick infill	Concrete on metal deck
Concrete	
Concrete Block	Unknown
Other	
Unknown	



Summary

- Seismic Evaluation of Portfolio of Buildings A wide range of thoroughness possible
- Risk = Hazard + Vulnerability
- Addresses used to estimate hazard
- Vulnerability A few key parameters can provide much of the required information
- Level of detail Dependent upon how the information is to be used.

